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L2: Entry 1 of 1 File: USPT Jan 11, 2000

DOCUMENT-IDENTIFIER: US 6014694 A
TITLE: System for adaptive video/audio transport over a network

Brief Summary Text (6):
A major challenge in transporting video over TCP/IP networks is that video requires much higher bandwidth than most other types of data objects. To illustrate, consider that the raw data required for a one hour movie shown at a resolution of 640.times.480 at 30 fps is approximately 100 GB, To transmit this uncompressed raw video over a 10 Mbps Ethernet link would take approximately 22 hours. The transmit the same video over a 28.8 Kbps modem would take approximately 320 days, Thus, it is clear, that for practical purposes, video must be heavily compressed for real time video transmission over a network have finite speed.

Detailed Description Text (12):
A high level block diagram illustrating the video server portion of the present invention in more detail is shown in FIG. 2. The video server 18 comprises one or more receivers 30, one or more senders 32 and a controller 34. During operation, a receiver instance is created for each request for a different video object. The data input to the receiver may be provided from an AVI file data file, for example. The video data file may be located on the same computer as the video server or may be located on a remote computer. The video data file can be stored on a single computer, e.g., video server, or on multiple platforms, e.g., multiple video servers, as described in more detail below. In this case, the video data is transmitted over a network that connects the remote video data and the video server. Each instance of the receiver 30 functions to receive data from the video data file that was previously generated by the video compression/file generator module 14.

Detailed Description Text (19):
The function of the video compression/file generator is to compress the raw video source into multiple levels of varying quality. In particular, the raw video source is compressed into three types of data objects commonly referred to as frames. The three types of frames include Key frames, P frames and B frames. These frames are similar to the I frames, P frames and B frames, respectively, as described in the MPEG-1 specification standard (officially designated as ISO/IEC 11172) and the MPEG-2 specification standard (officially designated as ISO/IEC 13818).

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L3: Entry 1 of 1 File: USPT Jan 11, 2000

DOCUMENT-IDENTIFIER: US 6014694 A
TITLE: System for adaptive video/audio transport over a network

Detailed Description Text (7):
The video compression/file generator 14 in combination with the video client 22 comprise a video/audio codec or coder/decoder that functions to compress, code, decode and decompress video streams that are transmitted over the network 20 into a compressed video and audio file. The compressed file may be in any suitable format such as Audio Video Interleaved (AVI) format. Note that the network may comprise any type of network, TCP/IP or otherwise including the Internet. The generation of the compressed video and audio file 16 can be performed either online or off-line. Typically, the video and audio file is generated off-line. Note that, any suitable method of video compression can be utilized in the present invention such as described in connection with the Motion Pictures Expert Group (MPEG)-1, MPEG-2 or MPEG-4 standards.

Detailed Description Text (18):
The generation of the video source file, e.g., video and audio file 16 (FIG. 1), and its internal format will now be described in more detail. As previously described, the video source file used by the video server to generate the video stream that is sent over the network connection to the client is created by the video compression/file generator 14 (FIG. 1). The input to the compression/generator is a raw video source 12. The raw video source can be, for example, a non compressed AVI file, a non compressed QuickTime file or a compressed MPEG-1 audio/video file.

Detailed Description Text (19):
The function of the video compression/file generator is to compress the raw video source into multiple levels of varying quality. In particular, the raw video source is compressed into three types of data objects commonly referred to as frames. The three types of frames include Key frames, P frames and B frames. These frames are similar to the I frames, P frames and B frames, respectively, as described in the MPEG-1 specification standard (officially designated as ISO/IEC 11172) and the MPEG-2 specification standard (officially designated as ISO/IEC 13818).

Detailed Description Text (72):
The video compression/file generator 212 functions similarly to that of the video compression/file generator 14 of FIG. 1 with the exception that the video compression/file generator of FIG. 15 generates a separate compressed video/audio file for each compression level. For N compression levels, the video compression/file generator 212 functions to generate a compressed video/audio file 214 for levels 1 through N. Considering the system described previously, compressed video/audio files 214 are generated for Levels 1 through Level 5. The compressed video/audio files may be in any suitable format such as AVI format. The generation of the compressed video/audio files 214 can be performed either on-line or off-line. Typically the video/audio file is generated off-line. Note that any suitable method of video compression can be utilized to process the raw video data 210 such as described in connection with the MPEG-1, MPEG-2 or MPEG-4 standards.

Detailed Description Text (74):
Each of the N video servers 216 can comprise the video server 18 (FIG. 2) described previously or may comprise a standard off the shelf video server such as the MPEG-2 based Media Server from Oracle Inc. or the NetShow Server from Microsoft Corporation, Redmond, Wash. The standard video server must be suitably modified to provide a communication capability with the rate controller 222 before it will operate in the present invention. The modifications typically include providing a communication interface between the standard video server and the rate controller.

Detailed Description Paragraph Table (1):

Term	Definition
AVI	Audio Video Interlcaved
CPU	Central Processing Unit
GOP	Group of Picturcs
GUI	Graphical User Interface
IP	Internet Protocol
ISDN	Integrated Services Digital Network
LAN	Local Area Network
MPEG	Motion Picture Expert Group
POTS	Plain Old Telephone Service
RSVP	Reservation Protocol
TCP	Transmission Control Protocol
UDP	User Datagram Protocol

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